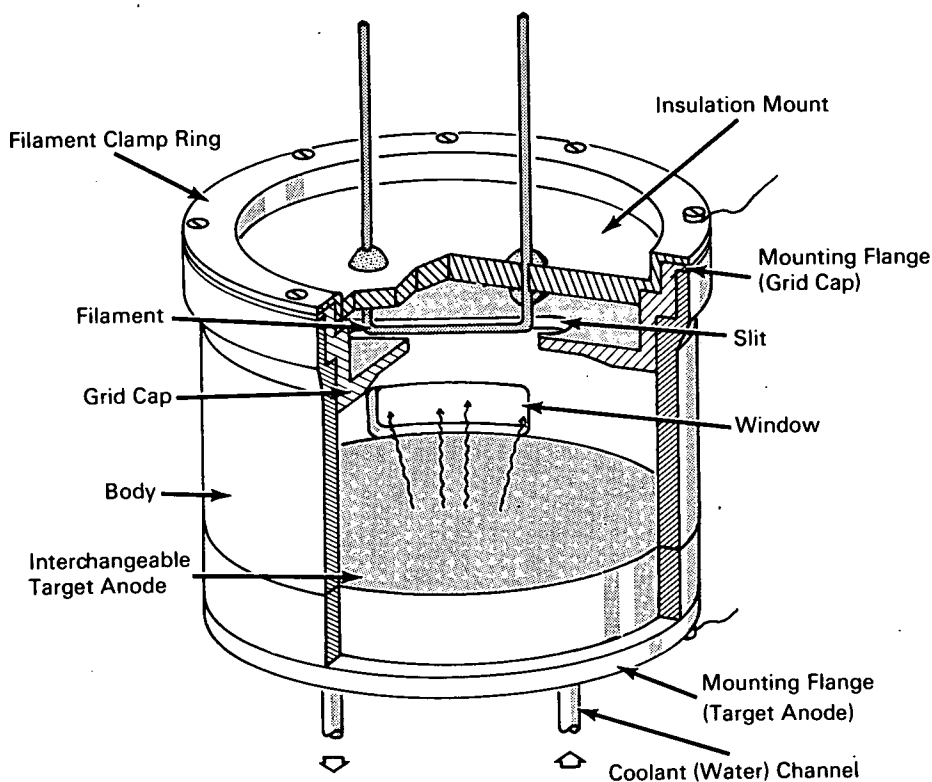


# NASA TECH BRIEF



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## X-Ray Source Uses Interchangeable Target Anodes to Vary X-Ray Wavelength



### The problem:

To design a compact laboratory X-ray tube that will be capable of generating X-rays of various wavelengths.

### The solution:

An X-ray tube in which the target anode can be easily interchanged to obtain X-rays of the desired wavelength.

### How it's done:

The body of the tube is made of boron nitride, which serves both as an electrical insulator and a heat sink. The window, which provides an exit for the X-rays, is located in the side of the body at the end adjacent to the target anode. The grid cap, made of electrically conductive material, is mounted on the opposite (flared) end of the body. A slit is provided in

(continued overleaf)

the grid cap for the filament, which is rigidly supported from the insulation mount. This mount is clamped against the grid cap by the filament clamping ring. Electron emission from the filament, which penetrates the slit by approximately 0.030 inch, is focused by adjusting the voltage applied to the grid cap. The interchangeable target anodes are flanged metal disks having a channel for circulation of coolant water. The wavelength of the X-rays produced by the tube depends on the metal (aluminum, copper, etc.) from which the anode is made.

**Notes:**

1. The X-ray source must be operated in a vacuum.
2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
NASA Pasadena Office  
4800 Oak Grove Drive  
Pasadena, California 91103  
Reference: B67-10218

**Patent status:**

No patent action is contemplated by NASA.

Source: Rex A. Shields  
(NPO-10036)